

What is claimed is:

1. A polishing method for electropolishing a metal film formed on a wafer surface so as to fill concave portions formed on the wafer surface, comprising:
 - 5 a step of determining an electropolishing end point of said metal film in accordance with a change of a current waveform resulting from electropolishing said metal film.
- 10 2. The polishing method according to claim 1, wherein said electropolishing end point of said metal film is found by differentiation of said change of said current waveform.
- 15 3. The polishing method according to claim 1, further comprising a step of continuing an electropolishing while controlling a current by reducing the current applied in said electropolishing until a current density in an electropolished surface reaches a predetermined current
20 density or less, after detecting said electropolishing end point.
4. The polishing method according to claim 1, further comprising a step of polishing said metal film or both of
25 said metal film and said wafer surface by a chemical buffing subsequent to a termination of said electropolishing, after detecting said electropolishing end point.
- 30 5. The polishing method according to claim 1, further comprising a step of polishing said metal film or both of

said metal film and said wafer surface by a chemical mechanical polishing subsequent to a termination of said electropolishing, after detecting said electropolishing end point.

5

6. A polishing method for polishing a metal film formed on a wafer surface having concave and convex patterns so as to fill concave portions on said wafer surface, comprising:

10 a step of polishing said metal film by alternating an electropolishing with a chemical mechanical polishing or chemical buffing.

7. The polishing method according to claim 6, wherein
15 said electropolishing is conducted to roughen said metal film surface, and said chemical mechanical polishing or chemical buffing is conducted to smoothen said metal film surface roughened by said electropolishing.

20 8. The polishing method according to claim 6, wherein the electropolishing end point in a last electropolishing process among a plurality of electropolishing processes is determined by a change of a current waveform resulting from electropolishing said metal film.

25

9. The polishing method according to claim 8, wherein said electropolishing end point is found by differentiation of said change of the current waveform.

30 10. An electropolishing apparatus for electropolishing a metal film formed on a wafer surface, comprising;

a current detector for detecting a current waveform
resulting from electropolishing said metal film; and

an end point determination part for determining an
electropolishing end point of said metal film on the
5 basis of a change of a current detected with said current
detector.

11. The electropolishing apparatus according to claim 10,
wherein the electropolishing end point of the metal film
10 in said end point determination part is found by
differentiation of said change of the current waveform.